Transceiver A

NI

Hybrid
& HPF

Received Power = R

Figure 1: Single Transceiver on a Line

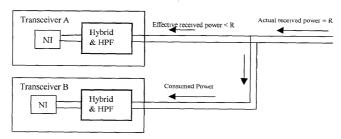


Figure 2: Attenuation of the Received Signal

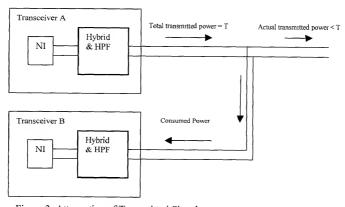


Figure 3: Attenuation of Transmitted Signal

Reflected power due to impedance R mismatch

Transceiver A

Hybrid & HPF

Transceiver B

Hybrid & HPF

Figure 4: Echo of the Transmitted Signal

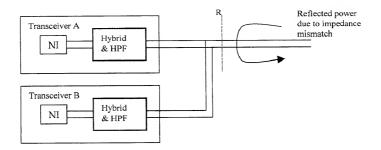


Figure 5: Echo of the Received Signal

Legend

NI: Normal Impedance

HI: High Impedance

HPF: High Pass Filter

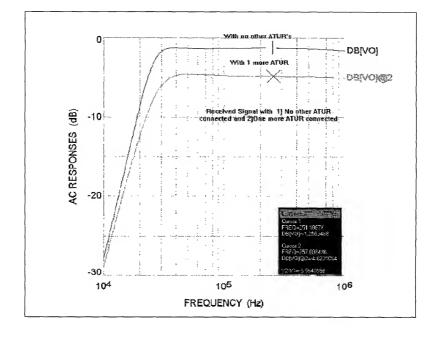


Figure 6: Reduction in the Signal Received by the ATU-R

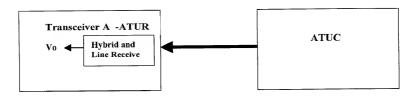


Figure 6a: Signal received when only one ATU-R is connected

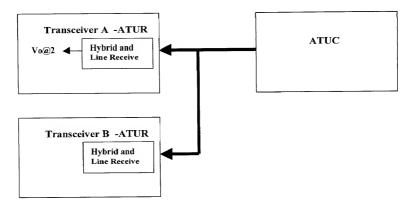


Figure 6b: Signal received when an additional ATU-R is connected to the same line

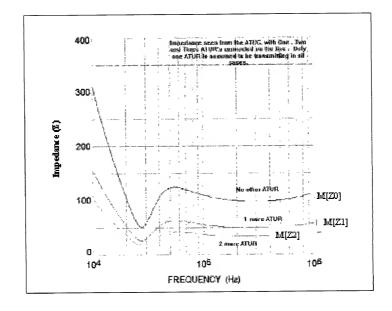


Figure 7: Reduction in the Effective Impedance with Multiple ATU-Rs

Impedance Seen from ATUC with only one
ATUR Connected, M[Zo]

Transceiver A -ATUR

Hybrid and
Line Receive

ATUC

Figure 7a: Impedance seen by the ATU-C with one ATU-R connected to the line

Impedance Seen from ATUC with two ATURs Connected, M[Z1]

Transceiver A -ATUR
Hybrid and
Line Receive

Transceiver B -ATUR
Hybrid and
Line Receive

Figure 7b: Impedance seen by the ATU-C with two ATU-Rs connected to the line

Impedance Seen from ATUC with three ATURs Connected, M[Z2]

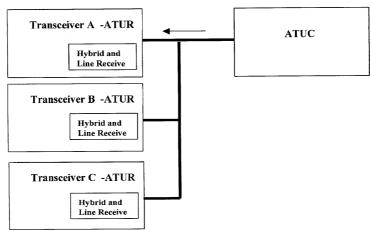


Figure7c: Impedance seen by the ATU-C with three ATU-Rs connected to the line

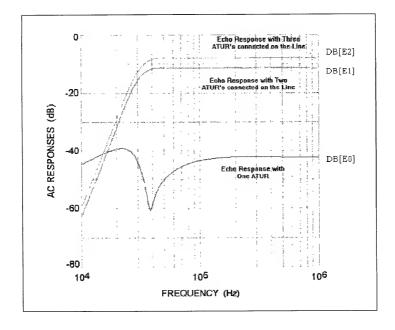


Figure 8: Increase in the Echo at the ATU-R due to other ATU-Rs

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Echo Response with only one ATUR

Line Receive

Hybrid

Echo E0

Figure 8a

Echo Response with two ATURs connected on line

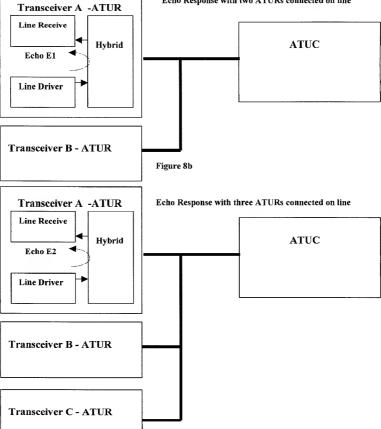


Figure 8c

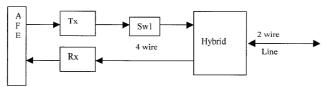


Figure 9: Implementation 1

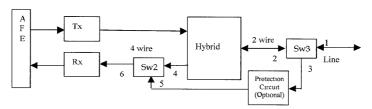


Figure 10: Implementation 2

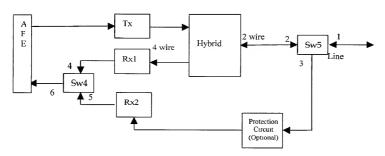


Figure 11: Implementation 3

Legend: Tx: Transmitter, Rx: Receiver, Sw: Switch, AFE: Analog Front End.

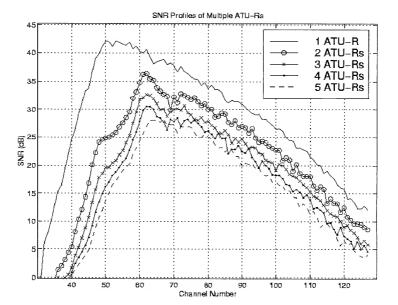


Figure 12: Simulation results of SNR profiles for multiple ATU-Rs

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